

REMARKS

Claims 1 and 2 are amended herein. In claim 2, formula 5 is amended to insert variable “j” which was inadvertently omitted in the previous Amendment and to change the double bond between X_{11} and X_{12} as indicated in the original specification, e.g., on page 9. Further, claims 1 and 2 are amended to clarify the claims and further define the claimed invention with respect to the repeating units of the respective recited polymeric substances. Hence no issues of new matter are presented.

II. Response to Claim Rejections Under 35 U.S.C. § 112, first paragraph.

Claims 1, 2 and 4-14 have been rejected under 35 U.S.C. § 112, first paragraph, allegedly because the specification, does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

Applicants respectfully traverse the rejection and submit that undue experimentation would not be required to make and use the presently claimed invention.

Specifically, in the Amendment filed on October 14, 2003, Applicants pointed out that it can be readily determined whether condition (c) is satisfied. This is even though examples of the homopolymers are not provided, because the relation between the bandgap energy of the repeating unit having the smallest bandgap, and the bandgap energy of the main component (contained in a larger amount) can be estimated from the fluorescent peak and absorption edge wavelength of a copolymer, respectively.

Although it can be estimated without making each of the homopolymers of formulae (1) and (3), whether condition (c) is satisfied, condition (c) can be accurately determined using the absorption edge wavelengths of the homopolymers.

It is generally known to one of ordinary skill in the art that the absorption edge wavelength has a relationship with spreading of a conjugation system as follows:

1) when the conjugation system spreads due to an increase of the number of aromatic rings or by forming a fused ring between aromatic rings, the bandgap becomes narrower and the absorption edge wavelength shifts to a longer wavelength direction;

2) when the aromatic rings have an electron donating substituent, the absorption edge wavelength shifts to a longer wavelength direction; and

3) when the aromatic ring has a heterocyclic structure, the absorption edge wavelength shifts to a longer wavelength direction.

In view of the above, one of ordinary skill in the art can easily obtain a combination of a repeating unit of formula (1) and a repeating unit of formula (3) that satisfies condition (c), based on, for example, Example 1 of the specification.

In Example 1, Ar₁ is a 2, 2'-dialkoxy-1, 1'-biphenyl-4, 4'-diyl group, and Ar₅ is a dialkoxyphenylene group, and condition (c) is satisfied.

An appropriate combination of repeating units which satisfies condition (c), can be easily obtained based on Example 1 based on the following.

When a repeating unit of a 2, 2'-dialkoxy-1, 1'-biphenyl-4, 4'-diyl group is constantly used as Ar₁, many kinds of repeating units of formula (3) can be used instead of the dialkoxyphenylene group in combination with Ar₁ that satisfy condition (c).

For example, the phenylene ring of dialkoxyphenylene group (Ar₅) can be replaced by a naphthalene ring or a heterocyclic group in combination with Ar₁ to satisfy condition (c).

The shift direction of the absorption edge wavelength by structural changes can be predicted from a typical homopolymer of a repeating unit of formula (1) or (2). Absorption

edge wavelength of many homopolymers can be determined fairly accurately from a few kinds of typical homopolymers. Accordingly, many combinations of a repeating unit of formula (1) and a repeating unit of formula (3) that satisfy the condition (c), can be made and used without requiring undue experimentation

Furthermore, calculation of the bandgap of a compound using a molecular orbital calculation such as MOPAC etc., is a well known method.

The bandgap relation between a homopolymer of formula (1) and a homopolymer of formula (3) can be easily determined by calculation and many combinations of a repeating unit of formula (1) and a repeating unit of formula (3) that satisfy condition (c) can be obtained without requiring undue experimentation.

In view of the above, it can easily be confirmed whether condition (c) is satisfied for many combinations of a repeating unit of formula (1) and a repeating unit of formula (3) by actually preparing several kinds of typical polymers.

When the substance contains three repeating units as in the case of claim 2, condition (f) can be easily confirmed by actually preparing several kinds of typical polymers in a similar way.

Thus, the present claims are sufficiently enabled by the specification. Accordingly, Applicants respectfully request withdrawal of the rejection.

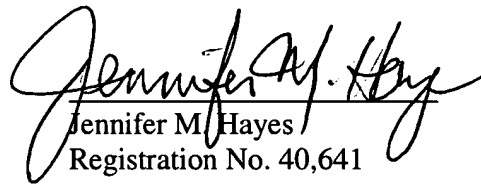
In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment under 37 C.F.R. § 1.111
U.S. Application Ser. No. 09/630,407

Attorney Docket No. Q60265

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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Date: June 22, 2004